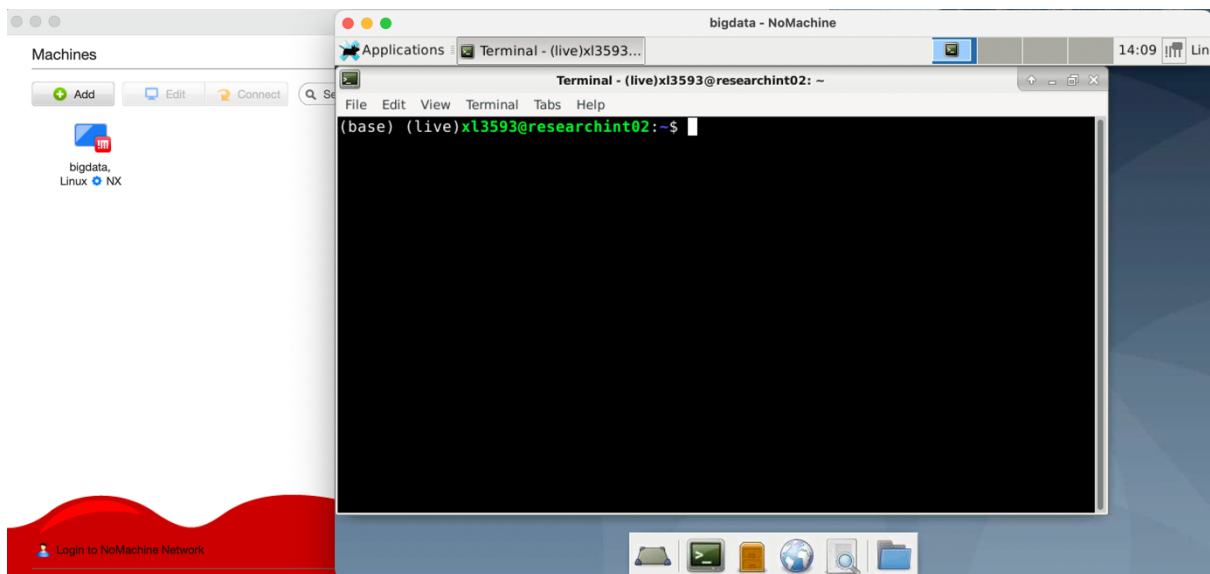


Part I

a.



b.

```
linximeng — (live)xl3593@researchint01: ~ — ssh -X xl3593@research.gs...
Last login: Wed Feb  4 19:38:24 on console
[(base) linximeng@linximengdeMacBook-Pro-4 ~ % ssh -X xl3593@research.gsb.columbia.edu]
xl3593@research.gsb.columbia.edu's password:
Linux researchint01 4.19.0-25-amd64 #1 SMP Debian 4.19.289-2 (2023-08-08) x86_64
#####
#
#          *****  Welcome to the CBS ResearchGrid Cluster  *****
#
#   Please always CC or send your inquiry / concerns / issues to:
#                   ResearchSupport@gsb.columbia.edu
#
#####
Last login: Fri Jan 30 11:03:56 2026 from 10.207.52.235
(base) (live)xl3593@researchint01:~$
```

Part II

Script: generate_1000_integers.py, part2_calculation.py

```

linximeng — (live)xl3593@researchint01: ~/Desktop — ssh -X xl3593@research.gsb.columbia.edu — 112x31
Last login: Thu Feb  5 15:20:05 on ttys000
(base) linximeng@linximengdeMacBook-Pro-4 ~ % ssh -X xl3593@research.gsb.columbia.edu

xl3593@research.gsb.columbia.edu's password:
Linux researchint01 4.19.0-25-amd64 #1 SMP Debian 4.19.289-2 (2023-08-08) x86_64
#####
#
#      *****  Welcome to the CBS ResearchGrid Cluster  *****
#
#      Please always CC or send your inquiry / concerns / issues to:
#                      ResearchSupport@gsb.columbia.edu
#
#####

Last login: Thu Feb  5 15:26:10 2026 from 10.207.52.235
(base) (live)xl3593@researchint01:~$ cd ~/Desktop
(base) (live)xl3593@researchint01:~/Desktop$ pwd
/user/xl3593/Desktop
(base) (live)xl3593@researchint01:~/Desktop$ nano part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ chmod +x ./part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ ls -l ./part2_calculation.py
-rwxrwxr-x 1 xl3593 xl3593 506 Feb  5 15:35 ./part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ grid_run ./part2_calculation.py
Warning: Permanently added '[research22.grid.gsb]:43763,[10.252.2.62]:43763' (ECDSA) to the list of known hosts.
Count: 1000
Sum: 481256983
Average: 481256.983
Standard Deviation: 286819.40630020964
Connection to research22.grid.gsb closed.

(base) (live)xl3593@researchint01:~/Desktop$

```

Part III

Script: lexical_analysis.py, HW1_3.sh

Merged summary output: summary_output.txt

```

linximeng — (live)xl3593@researchint01: ~/Desktop — ssh -X xl3593@research.gsb.columbia.edu — 112x31
#      Please always CC or send your inquiry / concerns / issues to:
#                      ResearchSupport@gsb.columbia.edu
#
#####

Last login: Thu Feb  5 15:26:10 2026 from 10.207.52.235
(base) (live)xl3593@researchint01:~$ cd ~/Desktop
(base) (live)xl3593@researchint01:~/Desktop$ pwd
/user/xl3593/Desktop
(base) (live)xl3593@researchint01:~/Desktop$ nano part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ chmod +x ./part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ ls -l ./part2_calculation.py
-rwxrwxr-x 1 xl3593 xl3593 506 Feb  5 15:35 ./part2_calculation.py
(base) (live)xl3593@researchint01:~/Desktop$ grid_run ./part2_calculation.py
Warning: Permanently added '[research22.grid.gsb]:43763,[10.252.2.62]:43763' (ECDSA) to the list of known hosts.
Count: 1000
Sum: 481256983
Average: 481256.983
Standard Deviation: 286819.40630020964
Connection to research22.grid.gsb closed.

(base) (live)xl3593@researchint01:~/Desktop$
(base) (live)xl3593@researchint01:~/Desktop$ nano ./lexical_analysis.py
(base) (live)xl3593@researchint01:~/Desktop$ chmod +x ./lexical_analysis.py
(base) (live)xl3593@researchint01:~/Desktop$ nano ./HW1_3.sh
(base) (live)xl3593@researchint01:~/Desktop$ chmod +x ./HW1_3.sh
(base) (live)xl3593@researchint01:~/Desktop$ grid_run ./HW1_3.sh
Warning: Permanently added '[research45.grid.gsb]:33393,[10.252.2.85]:33393' (ECDSA) to the list of known hosts.
Input: /shared/share_B9334/GRID/shakespeare.txt
Connection to research45.grid.gsb closed.
(base) (live)xl3593@researchint01:~/Desktop$

```